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|---|-------------|------------------------|--------------------------------|------------------|
| 10/799,486  | 03/12/2004  | Timothy Graham Bradley | BLD920040003US1                | 8390             |
| 36491 7590 04/04/2007<br>KUNZLER & ASSOCIATES<br>8 EAST BROADWAY<br>SUITE 600<br>SALT LAKE CITY, UT 84111 |             |                        | EXAMINER<br>UHLENHAKE, JASON S |                  |
|   |             |                        | ART UNIT<br>2853               | PAPER NUMBER     |
| SHORTENED STATUTORY PERIOD OF RESPONSE  |             |                        | MAIL DATE                      |                  |
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|   |             |                        | PAPER                          |                  |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

|                              |                                      |  |  |
|------------------------------|--------------------------------------|--|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/799,486 | <b>Applicant(s)</b><br>BRADLEY, TIMOTHY GRAHAM |  |
|                              | <b>Examiner</b><br>Jason Uhlenhake   | <b>Art Unit</b><br>2853                        |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 1/11/2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 5-11, 13, 17, 20-25, 27, 29, 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamaguchi et al (U.S. Pat. 5,77,644)

#### ***Yoshimura et al discloses:***

- ***regarding claim 1***, a pressurized ink chamber (Figure 2) configured to contain an electrorheological ink, the pressurized ink chamber in fluid communication with a nozzle (2)
- a stimulator pressure generation device (4) configured to generate a synchronization signal to increase the pressure in the pressurized ink chamber (Figure 2); and an electrode (6) arrangement configured to create an electric field to control a flow of the electrorheological ink at the nozzle (Figures 2-7; Abstract; Column 3, Lines 6-64)
- ***regarding claim 5***, the electrode (6) arrangement comprises one or more electrodes circumscribing a portion of the nozzle (Figures 2-5)
- ***regarding claims 6, 21***, the electrode arrangement is configured to create an electric field to stop (impede) the flow of the electroheological ink in the nozzle (Column 4, Lines 27-38)

- **regarding claims 7, 22**, the electrode arrangement is configured to create an electric field to slow (impede) the flow of the electrorheological ink in the nozzle (Column 4, Lines 27-38)

- **regarding claim 8**, a plurality of nozzles forming a nozzle array and the electrode arrangement is one of a plurality of electrode arrangements, each electrode arrangement disposed to control a flow of the electrorheological ink at one of the plurality of nozzles (Figure 2-8; Column 4, Line 55 – Column 5, Line 34)

- **regarding claim 9**, the flow of the electrorheological ink at each nozzle of the nozzle array is independently controlled (Figure 8; Column 5, Lines 16-34)

- **regarding claim 10**, a print control module configured to receive a print signal (Figure 12); a synchronization signal module (4) configured to control the synchronization signal generated by the stimulator; an electrode (6) control module configured to synchronize a voltage level at the electrode arrangement with the synchronization signal and the print signal (control unit; Column 6, Lines 29-50)

- **regarding claims 11, 24**, control module configured to de-energized the electrode arrangement about when the synchronization signal and the print signal are enabled (Column 4, Lines 23-54)

- **regarding claim 13**, a viscosity control module (32) configured to control the viscosity of the electrorheological ink as the electrorheological ink discharges from the nozzle (Figure 12; Column 6, Lines 29-50)

- **regarding claim 17**, computer readable storage medium comprising computer readable code configured to carry out a method for electrorheological printing,

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comprising; pressurizing an electrorheological ink in an ink chamber, the ink chamber in fluid communication with a nozzle; generating a synchronization signal, the synchronization signal increasing the pressure in the pressurized ink chamber; and creating an electric field to control a flow of the electrorheological ink at the nozzle (Figures 2-7, 12; Abstract; Column 3, Lines 6-64; Column 6, Lines 29-50)

- **regarding claim 20**, wherein controlling the flow of the electrorheological ink at the nozzle comprises changing the viscosity of the electrorheological ink (Abstract; Column 4, Lines 22-38)

- **regarding claim 23**, discharging a drop of the electrorheological ink from the nozzle (2) (Figure 2)

- **regarding claim 25**, method further comprises receiving a print signal (Figure 12; Column 6, Lines 29-50)

- **regarding claim 27**, controlling the viscosity of the electrorheological ink as the electrorheological ink discharges from the nozzle (Column 3, Lines 21-32; Column 4, Lines 22-38)

- **regarding claim 29**, a method for electrorheological printing, comprising; pressurizing an electrorheological ink in an ink chamber, generating a synchronization signal, the synchronization signal increasing the pressure in the pressurized ink chamber; and creating an electric field to control a flow of the electrorheological ink at the nozzle (Figures 2-7, 12; Abstract; Column 3, Lines 6-64; Column 6, Lines 29-50)

- **regarding claim 30**, electrorheological printing, comprising; means for pressurizing an electrorheological ink in an ink chamber; means for generating a

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synchronization signal, the synchronization signal increasing the pressure in the pressurized ink chamber; and means for creating an electric field to control a flow of the electrorheological ink at the nozzle (Figures 2-7, 12; Abstract; Column 3, Lines 6-64; Column 6, Lines 29-50)

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al (U.S. Pat. 5,77,644) in view of Darty (U.S. Pat. 6,312,110)

***Yamaguchi discloses:***

- ***regarding claim 15***, a nozzle configured to discharge a drop of ink; an ink having an electrorheological composition, the ink configured to change viscosity in response to an electric field (Figures 2-7; Abstract; Column 3, Lines 6-64)

***Yamaguchi does not disclose expressly the following:***

- ***regarding claim 2***, the electrode arrangement comprises a ring electrode pair having a first ring electrode and a second ring electrode

- ***regarding claim 15***, an arrangement of ring electrodes configured to create the electric field to control the rate of discharge of the drop of ink from the nozzle

***Darty discloses:***

- **regarding claim 2**, the electrode arrangement comprises a ring electrode pair having a first ring electrode and a second ring electrode (Figure 4; Column 1, Lines 35-41; Column 4, Lines 40-64), for the purpose of utilizing a high resolution print head

- **regarding claim 15**, an arrangement of ring electrodes configured to create the electric field to control the rate of discharge of the drop of ink from the nozzle (Figure 4; Column 1, Lines 35-41; Column 4, Lines 40-64), for the purpose of utilizing a high resolution print head

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of the electrode arrangement comprises a ring electrode pair having a first ring electrode and a second ring electrode as taught by Darty into the device of Yamaguchi, for the purpose of utilizing a high resolution print head

Claims 3-4, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al (U.S. Pat. 5,77,644) as modified by Darty (U.S. Pat. 6,312,110) as applied to claim 1 above, and further in view of Takahashi (U.S. Pat. 6,695,439)

***Yamaguchi discloses:***

- **regarding claim 16**, a nozzle array defining a plurality of nozzles, each nozzle defining a nozzle volume configured to contain an ink particle (Abstract)

- **regarding claim 3**, the first ring electrode is connected to a first electrical lead and the second ring electrode is connected to a second electrical lead (Darty: Figure 4; Column 1, Lines 35-41; Column 4, Lines 40-64)

- **regarding claim 16**, a plurality of ring electrodes forming a plurality of ring electrode pairs, each of the plurality of ring electrodes circumscribing one of the plurality of nozzles and each ring electrode pair corresponding to one of the plurality of nozzles (Darty: Figure 4; Column 1, Lines 35-41; Column 4, Lines 40-64)

***Yamaguchi as modified by Darty discloses all the claimed limitations above except for the following:***

- **regarding claim 4**, the first electrical lead is connected to a reference voltage and the second electrical lead is connected to a power supply, the power supply configured to supply a voltage that is different from the reference voltage

- a power supply connected via at least one electrical lead to one of each of the plurality of ring electrodes in each ring electrode pair, the power supply configured to supply power to the connected ring electrodes, thereby creating an electric field in each nozzle volume at each electrode ring pair

***Takahashi discloses:***

- **regarding claim 4**, the first electrical lead is connected to a reference voltage (ground) and the second electrical lead is connected to a power supply, the power supply configured to supply a voltage that is different from the reference voltage (Figures 31-34; Column 23, Lines 7-15; Lines 41-56), for the purpose of obtaining a desired a large amount of deformation even with a small number of electrodes

- **regarding claim 16**, a power supply connected via at least one electrical lead to one of each of the plurality of electrodes in each electrode pair, the power supply configured to supply power to the connected electrodes, thereby creating an electric



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field in each nozzle volume at each electrode ring pair (Figures 31-34; Column 23, Lines 7-15; Lines 41-56), for the purpose of obtaining a desired a large amount of deformation even with a small number of electrodes

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of Takahashi into the device of Yamaguchi as modified by Darty, for the purpose of obtaining a desired a large amount of deformation even with a small number of electrodes

Claims 12, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al (U.S. Pat. 5,77,644) in view of Shima et al (U.S. Pat. 5,801,730).

***Yamaguchi discloses all of the claimed limitations except for the following:***

- ***regarding claim 12, claim 26***, a pump control module configured to control a pump to control the pressure in the pressurized ink chamber

***Shima et al discloses:***

- ***regarding claim 12, claim 26***, a pump control module configured to control a pump to control the pressure in the pressurized ink chamber (Column 3, Lines 8 – 18), for the purpose of circulating ink in the apparatus.

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of a pump control module configured to control a pump to control the pressure in the pressurized ink chamber as taught by Shima et al into the device Yamaguchi, for the purpose of circulating ink in the apparatus.

Claims 14, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al (U.S. Pat. 5,77,644) in view of Mutou (U.S. Pat. 5,227,814)

***Yamaguchi discloses all of the claimed limitations except for the following:***

- ***regarding claim 14, claim 28,*** a media compensation module configured to modify the voltage level at the electrode arrangement to compensate for the variation in a speed of a print media on which the electrorheological ink is being printed

***Mutou discloses:***

- ***regarding claim 14, claim 28,*** a media compensation module configured to modify the voltage level at the electrode arrangement to compensate for the variation in a speed of a print media on which the electrorheological ink is being printed (Column 5, Lines 30 – 48), for the purpose of shortening recording time.

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of a media compensation module configured to modify the voltage level at the electrode arrangement to compensate for the variation in a speed of a print media on which the electrorheological ink is being printed as taught by Mutou into the device of Yamaguchi, for the purpose of shortening recording time.

Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al (U.S. Pat. 5,77,644) in view of Minemoto et al (U.S. Pat. 6,224,193)

***Yamaguchi discloses:***

- ***regarding claim 19***, the electrode arrangement comprises one or more electrodes (6) circumscribing a portion of the nozzle (2) (Figures 2-5)

***Yamaguchi does not disclose expressly the following:***

- ***regarding claim 18***, creating an electric field comprises creating voltage difference between a first electrode and a second electrode

***Minemoto et al discloses:***

- ***regarding claim 18***, creating an electric field comprises creating voltage difference between a first electrode and a second electrode (Column 4, Lines 19 – 33), for the purpose of ejecting from an ejection electrode with reliability and stability.

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of creating an electric field comprises creating voltage difference between a first electrode and a second electrode as taught by Minemoto et al into the device of Yamaguchi, for the purpose of ejecting from an ejection electrode with reliability and stability.

***Response to Arguments***

Applicant's arguments with respect to claims 1-13, 15-27, and 29-30 have been considered but are moot in view of the new ground(s) of rejection. Please see the above rejections regarding Yamaguchi et al (U.S. Pat. 5,77,644)

Applicant's arguments filed 1/11/2007 have been fully considered but they are not persuasive. Regarding claims 14 and 28, the test for combining references is not what the individual references themselves suggest but rather what the combination of the disclosures taken as whole would suggest to one of ordinary skill in the art (In re McLaughlin, 170 USPQ 209 (CCPA 1971)). The test for obviousness under 35 U.S.C. 103 is not the express suggestion of the claimed invention in any or all of the references but what the references taken collectively would suggest (In re Conrad, 169 USPQ 170 (CCPA 1971))

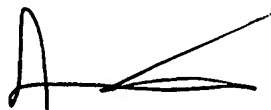
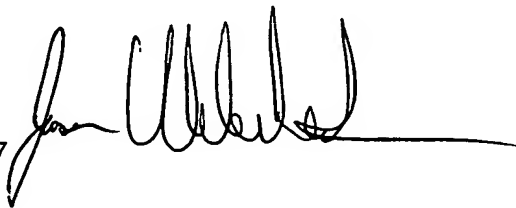
**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Uhlenhake whose telephone number is (571) 272-5916. The examiner can normally be reached on Monday - Friday 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JSU  
March 27, 2007



STEPHEN MEIER  
SUPERVISORY PATENT EXAMINER